Duke University Library
SEP 16 1940
Durham, N. C.

EDUCATIONAL RESEARCH BULLETIN: ERB

SEPTEMBER 11, 1940

COLLEGE OF EDUCATION
THE OHIO STATE UNIVERSITY

Vol. XIX, No. 12

EDUCATIONAL RESEARCH BULLETIN

(Entered in the United States Patent Office)

W. W. CHARTERS . . . . . *Editor*

J. MACLATCHY . . . . . *Assistant Editor*

PUBLISHED MONTHLY BY THE BUREAU OF EDUCATIONAL RESEARCH, OHIO STATE UNIVERSITY, FOR THE SCHOOLS OF OHIO. EDITORIAL AND BUSINESS OFFICES, ROOM 203, COLLEGE OF EDUCATION, COLUMBUS, OHIO

Adventures in the Reconstruction of Education

THE series of articles entitled "Adventures in the Reconstruction of Education" will appear at intervals during the next few months. This series has been made possible through the co-operation of the Commission on Teacher Education of the American Council on Education. The Commission has thus co-operated in facilitating the report of educational experimentation, but it assumes no responsibility for the ideas expressed.

The series will be published in the fall of 1940 as a cloth-bound book of approximately 300 pages. The size of the edition will be determined by the number of orders received prior to printing. Advance orders may be placed at once at $1.50 for single copies, or at $1.25 each for five or more copies. Orders should be addressed to Dean Arthur J. Klein, College of Education, Ohio State University, Columbus.

The Development of Experimental Attitudes 335

D. OBERTEUFFER, H. B. ALBERTY, W. P. ASHBROOK, C. S. BERRY, W. W. CHARTERS, DORIS CLICKINGER, L. H. DIERCKS, R. H. ECKELBERRY, H. P. FAWCETT, MARY GILES, J. R. HOPKINS, H. GORDON HULLFISH, WILLIAM JOHN JONES, L. L. LOVE, C. B. MENDENHALL, C. W. MOORE, GLADYS PALMER, S. L. PRESSEY, SAMUEL RENSHAW, F. P. ROBINSON, H. F. SEELY, J. D. TELLER, J. B. THARP, W. L. VALENTINE

The Nature of Experimentation 336

Experimentation in Broad Experiences 340

Special Opportunities for Experimentation 355

Summary 359

THE EDUCATIONAL RESEARCH BULLETIN is published fortnightly except during June, July, and August. Entered as Second-Class Matter, February 9, 1922, at the Post-Office at Columbus, Ohio, under the Act of August 24, 1912. Accepted for mailing at specified rates of postage provided for in Section 1103, Act of October 3, 1917, authorized February 21, 1922.

Educational Research Bulletin
SEPTEMBER 11, 1940
Vol. XIX, No. 12

The Development of Experimental Attitudes

D. Oberteuffer, *Chairman*, H. B. Alberty, W. P. Ashbrook, C. S. Berry, W. W. Charters, Doris Clickenger, L. H. Dierckes, R. H. Eckelberry, H. P. Fawcett, Mary Giles, J. R. Hopkins, H. Gordon Hullfish, William John Jones, L. L. Love, C. B. Mendenhall, C. W. Moore, Gladys Palmer, S. L. Pressey, Samuel Renshaw, F. P. Robinson, H. F. Seely, J. D. Teller, J. B. Tharp, W. L. Valentine

An experimental point of view has been present in the College of Education, Ohio State University, since its early days. Few teachers on the staff have refused to try out new ideas, to seek new and better ways of doing the job. Under these circumstances experimentation within the College has become a sort of prevailing wind, shifting its direction and altering its intensity from one year to another and from one area to another, but always blowing strong enough to keep the College out of the doldrums of tradition.

An account of experimentation in the College must necessarily treat of many projects, projects as diverse as research on the physiology of the retina, changes in the method of teaching languages, new laboratory methods in the fine arts, or an intensified program of personal counseling. Different as these are, they all involve a common element, the testing of hypotheses growing out of the continuous planning involved in attempting to accomplish the purposes of the College. Experimentation has many media, many techniques, many interpretations, and this diversity of method and substance has tended to accustom members of the staff to receive critical appraisal of their efforts.

Students seeking experience with experimental procedures may find it by assisting or observing staff members who are engaged in experimentation, by studying experimental procedures, or by exercising their own skills in the laboratory. It is expected that students will develop experimental attitudes

and receive experience in advancing hypotheses, critically analyzing pertinent data, and asserting tentative conclusions that are established as guides to further action.

In these terms the discussion of this section will go forward, therefore, on the basis of two already apparent assumptions: first, the process of experimentation can be regarded simply as the process of proposing and testing hypotheses; and second, the most effective way to promote the development of experimental attitudes on the part of students and faculty is to provide continuous opportunities for actual participation in the process.

The Nature of Experimentation

EXPERIMENTATION is a process of valuation. It involves the acceptance of a method for arriving at guides for action. It rejects flatly the notion of absolute truth awaiting discovery. It holds that individuals co-operatively using the method of intelligence progressively evolve from their on-going experiences the answers which are best for the situations they face. If experimentation is regarded as a process involving acts of valuation, this means that the experimenter must have a scheme of values, a set of clearly defined purposes. Between conditions as they exist, and conditions as they should exist in terms of one's pattern of values, the opportunities are many, for those who are sensitive, to propose and test plans of action that promise to advance one's position. When one has clearly conceived purposes, it is easier to see things which are wrong, to recognize deficiencies or shortcomings in things as they are, and to suggest ways of changing conditions in order that ends in view may be achieved.

Experimentation, then, is here viewed as a valuing process involving the testing of hypotheses through controlled inquiry. This implies that the hypotheses should be stated clearly and in a delimited fashion. This step of delimitation is of great importance. Until it is taken, the hypotheses do not provide the direction which is necessary for one who would seek evidence. A problem is of necessity the first phase of a reflective process. Each problem is for each individual a personal thing and must be personally defined. In whatever way and in whatever

degree of clarity it arises, the problem needs to be turned around intellectually until it is grasped in working terms. As a matter of fact, unless out of this turning a hypothesis emerges, no more can happen than a kind of ceaseless turning that goes around and around but comes out not at all. Unless a problem exists, there will be no need to gather data; but unless a hypothesis exists there will be no way to determine what are or are not data. The force of the hypothesis is that it makes testing, hence solution, possible. The hypothesis is used in order to draw implications from it, to predict the consequences of accepting it, and to explain facts as they are discovered.

It follows that the design for the experiment is important. A consideration of all factors which are regarded as having any influence on the hypothesis and provision for determining the nature of such relationships are involved. It is more desirable to include too many factors for consideration at this stage than to rule out that which might later prove to be of vital importance. The abilities to see relationships, to see the application of principles in new situations, to see alternatives throughout, and to anticipate probable consequences of proposed actions are vitally important in helping one to decide upon factors relevant to the problem under consideration.

Following this canvass of the field to determine factors which need to be taken into consideration, the next step is to consider what kinds of information need to be gathered about these relevant factors and to decide upon the conditions which promise, at least tentatively, to provide a fair test of the hypotheses proposed. It is then necessary to select or construct instruments which will yield such data and, obviously, the validity, reliability, and objectivity of these instruments should be ascertained.

As the experimental procedure is being carried forward it may be anticipated that modifications in procedure will be necessary. This is particularly true in those fields, such as education, where the human factor looms so large. Rigorous control in such experimentation, while no less necessary, has a wider meaning here than it has in those situations where everything that needs to be held in control can be so manipulated.

An important feature of educational research which is often overlooked is the act of recording quite precisely and extensively the processes which are carried on during the course of

the experiment. These records of the experimental processes may be of various types, such as anecdotal records, observational notes, stenographic reports, minutes of committee discussions, logs of teaching procedures, and various forms of planning data and the like.

It might be fair to assume that when the procedure described had been followed, the problem of the interpretation of results obtained would be relatively simple. Such is not necessarily the case. As a matter of fact, this is usually the most difficult step of the experimental procedure. It is, of course, made the more difficult when care is not exercised in the formulation of the hypothesis. It is made impossible when the hypothesis is ignored or facts are collected willy nilly. In any case, it is necessary to be aware of shortcomings in the procedure and of faults in the data and to make due allowance for them in the interpretation of the results. Systematic or chance errors of measurement need to be taken into account. Allowance should be made, where necessary, for the fact that only a sample has been tested. Caution needs to be observed, therefore, in the generalizations made following the completion of the experimental activity. The conclusions should be critical, incisive, and so stated that they suggest still other hypotheses which can be tested experimentally. Moreover, they should themselves be viewed as established in and through experimental procedures and hence subject to further scrutiny should later evidence bring them into question.

This point of view suggests that at the conclusion of an experiment one has an obligation to do more than merely report the findings. Value should be placed upon them. In terms of the purposes out of which the original problem, and subsequently the hypotheses under consideration, emerged, one should decide upon the worth of the outcomes achieved. Statistical significance, though it should be determined, should be clearly distinguished from social significance. Some of the more significant experiments are those which open up new problems, report a new synthesis of old knowledge, are the first in a particular area, constitute a single disproof of a widely held theory, reveal new relationships, and the like, yet have a questionable statistical significance.

There is nothing revolutionary about the concept of experimentation here briefly presented, but acceptance of it by a staff

has some definite implications. The principal one is that members of the staff must be continuously engaged in clarifying their own purposes and co-operatively developing the goals and objectives of the total program toward which each, in his own way, will strive. Another important implication is that all members of the staff, having participated in the formulation of purposes, and therefore being aware of the ramifications of the problems under consideration, are morally obligated to make contributions to the various aspects of the experimental procedure according to their abilities. This concept of experimentation implies, in other words, a different understanding of the function of the expert or specialist. All members of the staff, in relation to their training, competence, and ability, participate in varying degrees in experimentation.

The development of experimental attitudes should not seek a method that is foreign to practical action. Individuals who daily must deal with problems must become aware of themselves as doing so in a manner which makes more intelligent the conduct of their lives. This is quite different from the conception of experimentation which has grown up in the popular mind, under the impact of the appropriate effort of scientists to control their investigations. Furthermore, the emphasis upon the quality of the act throws into bold relief the casting aside of mere habituation, dogmatism, and authoritarianism as directive factors in behavior. Hence, the adoption of the experimental attitude carries significant social consequences. The experimental attitude is an essential quality of the democratic way of life.

All of this, of course, is but a way of presenting evidence to show that the experimental method is not so much a step-by-step process as a reflective attitude that gears one to a responsibility for the pursuit of problems that arise within experience, sensitizes one to the need for a personally formulated tentative solution before this pursuit can be advanced, and shows both a willingness and a courage to act on the ideas which reflection designates as promising. It recognizes that the function of action is to provide a test for the tentatively directing idea—the hypothesis. It readily discards hypotheses as uncovered facts call them into question, treats authority with the respect that is due it when it rests on evidence but views it skeptically otherwise, and sees itself as applicable to all reaches of thought and action.

It might not be inappropriate to add the point that reflection in the social fields—and this is where the educative process occurs—is in appearance less neat than that which takes place in the physical fields. Where human values and issues are at stake, we seek to develop an attitude which sees programs of action as tentative, and which is sensitive to the need for reconstruction as facts become data in support of competing hypotheses.

Experimentation in Broad Experiences

EXPERIMENTAL experiences offered to students in the various areas of the College program vary in intensity and in worth, and because they are so plentifully available only a few may be presented here. In the eyes of some the following developments may be viewed as merely the routine application of common sense to the work of preparing teachers, not dignified by the designation "experimental." There is reason to believe, however, that students in these situations come a little closer to the development of experimental points of view than if such opportunities were denied them.

In fine arts, for instance, an active effort is made to put each student, no matter what his age, vocational objective, or ability, into a position where he may work creatively on problems of his concern. To accomplish this the emphasis in the organization of each class is necessarily placed upon the individual, his past experiences, his present understandings, and his needs.

Experimentation to push back the boundaries of understanding through creative expression has been a constant struggle of artists. How to develop understanding, how to utilize information in the process, are basic problems in an approach to learning for the artist.

Since the fine arts promote the learning process through direct contact with media of expression, the student is engaged in active experimentation with his materials. What the student draws or paints is the paramount consideration. How he does it is so definitely bound up with his stage of development and his personality that any teaching procedure other than an experimental and personal one is untenable.

The teaching procedure is successful, therefore, only when it furnishes the student with opportunities to experiment with problems suited to his development. It often happens that the change from one medium to another or from one kind of subject-matter to another operates as a catalytic process which releases new energy for the new experience.

The experimental procedure is made the more imperative in this area because of the very nature of the visual arts. There are no formulas for designing or painting, no one system for arriving at a well-adjusted work of art. There are basic structural concepts, but their values to the individual are of the most personal sort. The teacher's function lies in the communication of these basic concepts without formalizing the personal contribution of the student during the process. Each member of a class has a most personal existence within the field, and the experimental activities are designed to broaden the visual experience for each student. No teacher can teach art in these terms without a creative attack upon individual problems.

A variety of experiences in the Department of Fine Arts has substantiated this. When the courses in ceramic art were inaugurated, it was found that beginning students were restless during the preliminary studies which must precede creative work in ceramics at a high level. It was difficult for them to realize the value of such allied subjects as drawing and painting, and no amount of talking about their importance for one who planned to create in three-dimensional forms helped with the problem. To meet this situation the suggestion was made that a general view of the ceramic process would help the student to appreciate the usefulness of a wide variety of experience in a training program in ceramic techniques. To test this hypothesis a moving picture was made in which one of the professors demonstrated the use of clay from the raw state, as it is mined, to a completed vase, decorated and glazed. This film, shown to beginning students, met the problem as the plan had suggested it might. The students came to realize where their own elementary problems fitted into the total process. The success of this film led to the making of others in which the processes of water-color painting, oil painting, and marionette making are shown.

Other instances of the experimental approach are perhaps not so spectacular in achievement yet their presence is a neces-

sary factor in creating the appropriate atmosphere for both learning and teaching. In a class of thirty students, to take a case in point, several were seemingly afraid to commit themselves by making a drawing. Others, with perhaps too much self-confidence, produced pages of wild scrawls and unrelated symbols, and a further group made good but exceedingly small miniature drawings without any relation to the size of the drawing paper. The instructor decided to try out an idea which he believed would be of help to all three groups. The students were given a very large sheet of paper, and a time limit of three minutes was set for the drawing. The entire character of the problem which the students faced was thus changed. The value of this experiment was well demonstrated when the students returned to the use of smaller sheets of paper, with an accompanying longer time period, and functioned with more security and success than they had before.

In an advanced portrait painting class several students developed formulas for the painting of flesh. Each formula was supplanting the keen observation essential for a successful painter. How to awaken these students to a realization of their lack of perception was the problem before the teacher. He consulted other painter members of the staff, and they decided to try posing two models, a blond and a brunette, to be used together in a picture. The contrast between the two was so evident that no formula would answer for both. This was so thoroughly demonstrated by the time the picture was painted that even the worst offender was ready to admit the stereotyped character of his previous painting. This experiment has led to the adoption of the procedure at appropriate intervals throughout the year.

The curriculum in fine arts has always included courses in sculpture, taken by Juniors and Seniors after the completion of required courses in drawing. A marked improvement in drawing was evident after students had some experience with the problems of sculpture. This led to a belief that the realization of three-dimensional form came more quickly through the problems involved in sculpture than through drawing alone. In order to test this theory students in beginning drawing were sent to the sculpture room for one of their required periods each week. The results made it evident that students who have some modeling experience make faster progress in the drawing

courses. Students approached the problem of presenting three-dimensional shapes on a two-dimensional plane with a fuller understanding of the problem since the building of shapes in clay promotes comprehension of what these shapes are.

In the art program at the University School it was apparent from the beginning that the teacher should not define problems for the students, choose their materials, prescribe their methods, or evaluate their results. These mistakes have resulted in the almost universal failures of secondary-school art programs. Working conditions in the studio at the University School, therefore, were arranged to enable both pupils and teachers to maintain the experimental attitude. Each individual undertaking work in the studio is faced with the problem of making many types of choices. A pupil new to the studio may indicate merely a vague desire to explore the possibilities of various materials. Other pupils, having a long background of experience, may be ready to carry on a definite program in a specialized field. But at whatever stage the pupil finds himself, the teacher, through conference and discussion helps him assume responsibility for selecting his materials and developing a tentative method of procedure.

In order to facilitate planning, the development of method, and continuous evaluation, a record has been developed which is useful. On one side of a card 5 inches by 7 inches the pupil places his name, grade, and the date in the space allotted. He follows this with a brief statement of his project, tells why it is of interest to him, and formulates the purposes that guide it. He estimates the time it will take to complete it, the materials he will use, and their cost. Before he begins work his plan is discussed with the teacher, in terms of the pupil's background and needs as these have been revealed through previous activity. When the project is completed, the student places on the reverse side of the card the date, an estimate of his results, the reasons he sees for his success or failure, and a checkup on his time and cost estimates. This side is usually not completed until there has been a discussion with the teacher about the completed work. When such an approach to the teaching of art is employed, the chief responsibilities of the teacher are to provide stimulation and to promote planning.

Whenever possible, therefore, the teacher keeps in contact with the work that pupils do in other classes in the school,

and through conferences with other teachers receives suggestions about the interests and difficulties that pupils have. This information is useful during conferences with the student, however brief. As in any good laboratory or workshop, those who are most advanced help those who are beginning, and the range of activities and levels of achievement is in itself instructive.

The intellectual aspects of research and experimentation are perhaps too frequently overemphasized. The aesthetic, creative, emotional, and imaginative qualities of experimentation need more to be recognized. Thus it should not seem unusual to find in a discussion of experimentation examples from aesthetic fields. A further illustration involving art is pertinent because of the wide implications of its findings. Freshmen in the first education course frequently make field trips to community agencies in the course of their work. When they do, they are asked to write out their reactions to the experience. One boy, after visiting the State School for the Blind, asked his adviser if he might sketch his feelings instead of writing them. When the adviser looked at the sketch he was baffled by the problem of interpretation. Usually student reports are analyzed to locate patterns of values or directing purposes. The adviser felt unable to interpret this sketch.

On the hypothesis, however, that students reveal values when they create with art materials quite as much as they do in verbal and oral expression, one of the members of the Department of Fine Arts was asked to study the sketch for expressions of value. He was given no information about the student, not even his sex, other than that the sketch was a summary of his reactions following a visit to the blind school. The staff member first wrote a report of the student as he revealed himself through the sketch, and he was then provided with supplementary data about the student, including several papers which the student had written as well as results from several diagnostic tests. He then arranged an interview with the student to discuss the sketch. The value interpretation of the sketch proved to be unusually accurate. When excerpts from the other data about the student were arranged in a parallel column beside the staff member's report, the degree of correspondence was very pronounced.[1] There were, of course, respects in which the sketch

[1] For a complete report of this experiment *see* Grimes, James W., "Values in a Work of Art," EDUCATIONAL RESEARCH BULLETIN, XIX (May 8, 1940), pp. 283–92.

analysis differed, or erred, but the results from this experiment, though with but one subject, tend to support the hypothesis that the teacher of art can locate the basic values of his students through study of their art products.

The relationship between the art specialist and the education instructor revealed in the foregoing discussion is but one instance of improved staff relationships that have followed upon a college-wide emphasis upon the development of the experimental attitude. Moreover, it is evident that relationships between staff and students have likewise changed. Work with staff members on experimental projects, and in class situations and in interviews where value is placed upon a way of getting to answers to problems, rather than upon the answers, has narrowed the gulf which has traditionally separated students and teachers. As a case in point the behavior of students in corridors, on the stairs, and in the classrooms in the University School recently left much to be desired. Moreover, many students did no credit to themselves or to the school in their off-campus contacts in drug stores, street cars, theaters, and the like.

A committee authorized by the faculty recognized that the problem could not be solved without the co-operation of the students; hence an outline of the major problems was presented to the student body and each class was asked to appoint a member to the already existing faculty committee. This combined committee held several meetings in which the major problems were further defined and listed in appropriate categories.

One group of problems centered around the study hall and the utilization of the free time of the student. This problem was referred to the study-hall teachers and to those in charge of laboratories. Another group of problems, arising from student behavior in corridors, on the stairs, and off the campus, was discussed with the School Council. Subcommittees were appointed to formulate tentative plans and present them to the larger committee for action and decision. After about three weeks of study the subcommittee was ready with proposals for solving the problems. The next step, not yet taken, will be to submit these proposals to the student body as a whole for approval and, where approved, to test the plans in action.

Once they gain the notion that they may contribute, students will ordinarily respond to opportunities to experiment with the structure of courses themselves. For example, in a course in

the teaching of Romance languages, the instructor lectured and made available copious collateral reading in periodicals and books. The syllabus was prepared in logical order, from the consideration of the values of foreign-language study to testing procedures. The students prepared problems simulating a class of beginners learning vocabulary, pronunciation, points of grammar, and the like. Observations of classes in the city schools were also a part of the structure of the course.

Recently, however, the instructor, desirous of vitalizing the course, evolved the hypothesis that, if he took the idea of student participation in curriculum planning seriously and reorganized his class to bring this about, a more functional "methods" course would result. After a first day of class discussion the students spent a week visiting beginning language classes at the University, at the University School, and in the Columbus schools. The students sought out every sort of problem they could identify as affecting their future behavior as teachers and which they thought might be studied in a "methods" course. The records of these personally recognized problems were made available to the instructor, who then planned his course to facilitate work on them. The mimeographed syllabus, formerly used, is now merely suggestive, and the readings serve to make available at appropriate points the ways in which others have met and solved comparable problems.

Another illustration of the co-operative nature of some of the experimentation being carried forward in the College can be found in a project now going on to develop better forms for rating student teachers. The supervisors, finding the form being used to evaluate student teachers inadequate, asked the Evaluation Division of the Bureau of Educational Research to assist in preparing a revision. In a meeting with all of the supervisors, principles or criteria which should be directive in forming the revised form were developed. Two committees were then appointed, one to attack the problem of the revision of the rating form, the other to devise ways of recording the previous experiences of student teachers. Both committees developed tentative record forms, which after being discussed and revised in a meeting of the entire group of supervisors, have been experimentally used. The form for recording previous experiences may develop into a cumulative record involving a study of all the record forms used in the College.

Students are included in this experimentation. Inasmuch as a new basis for the rating of student teaching will be used next year, it was felt that if the students were to participate as Juniors in the revision of the form, they could more intelligently participate as Seniors. The forms are not rating devices but forms for recording the procedures which teachers use, and for this reason Juniors in a course in the principles of secondary education which requires twenty observations in schools or community agencies were asked to use the tentative teaching record forms as a basis for their observations. This they did, indicating changes which, after using them, they felt should be made. Moreover, discussion of the bases for the appraisal of student teaching was carried on in class and further suggestions for revision of the form resulted.

Public-school teachers who supervise the student teachers from day to day have likewise participated in this project. They have used the tentative forms and have met in seminar groups on the University campus to discuss their use and their improvement. Nearly three hundred people have thus far taken part in the experimental development of the student-teacher evaluation records. The content of courses, the character of the College record system, the quality of University field relations, as well as the nature of the student-teaching experience itself, have been affected by this experimentation.

Departments, quite as much as individuals or small groups of specialized people, are involved in the experimental climate of the College, and the effort of the Department of Education to reconstruct its graduate program is worthy of note. The regulations of the Graduate School are so general that any department may constantly experiment with new procedures regarding the admission of students to graduate standing, the advisory system, curriculum, and examinations. It is not free to change the conditions for the language requirement in the doctorate of philosophy program.

The Department of Education, in common with other departments, has certain regulations concerning the preliminary examinations that precede the general examination for doctoral candidates. A few years back when the Department reorganized this requirement for a preliminary examination it explicitly authorized the Committee on Graduate Work in Education to experiment with various ways of conducting this examinaton.

The Graduate School requires that the general examination shall consist of a written portion followed by an oral portion. Under the practice of the Department of Education the written portion of the examination of a student consists of major tests of eight hours' duration in one or two fields, and a series of minor tests on related fields. The particular fields to be included and the weight to be given them in terms of examination hours are determined by the student's advisory committee in consultation with the student and in accordance with certain general requirements established by the Department. While the fields of examination for any student are related, the questions for the different tests are prepared by different specialists without consultation with each other. On any day set for examinations the student is given a test in a certain field, writes on it, and turns in his paper. The next day he is given a test in another field. Hence, the student deals with each portion of his examination without reference to or knowledge of what is in the tests that are yet ahead. Thus any formal testing of the ability of the student to relate knowledge in the other fields to problems in the field of his major interest was confined to the oral portion of the examination. Certain professors in the Department proposed the hypothesis that it would be possible and desirable to develop a type of examination which would better assess the ability to integrate knowledge from many fields around problems in the major field. In testing this hypothesis a student was given a description of a practical school situation and asked to deal with it in a unified paper.

The new form theoretically had certain definite advantages over the old. It gave the student the opportunity to assemble his knowledge around problems; it permitted him to deal in related fashion with two or more closely related problems in different lists of questions; it tested his ability to plan and to organize his thinking on a fairly large scale. It seemed, therefore, to be more closely related to the type of thinking he would do when he faced real problems and promised, for this reason, to be a more valid test.

But experience with several students, including some very good ones, indicated that this "integrated examination" was not entirely satisfactory. To write a fully integrated paper dealing with a problem selected by someone else in such a way as to answer several questions in each of a number of different fields

which had been prepared by different specialists, who had neither consulted each other nor the problem, proved so difficult as to be impossible. Hence a modified form was tried out again with the co-operation of students who, with their own advisory committees, were willing to act as experimental subjects.

Under this revised plan, the student selected, with the approval of his advisory committee, a large, practical problem in the field of his major interest. Typically, this was a problem in a field situation in which the student assumed that he held a certain position. He described the situation and the position which he held and assumed that in this position he was expected to participate in a program of improving an educational program through a period of several years. In his examination he was to show his plan of procedure.

This statement of the problem, after receiving the approval of his advisory committee and after revision in accordance with pertinent criticisms, was sent to the specialists in the various areas to be covered by the examination, with the request that each prepare an examination in his own area, but that he ask questions which would be relevant to the central problem which the student had selected. The student was then asked to prepare a paper dealing with the problem and answering the questions.

Those who had hoped that this modification would represent an improvement were again disappointed. The students seemed unable to answer all the questions and at the same time to organize their papers adequately. Inasmuch as there was general agreement on this question, experimentation with this particular type of examination was dropped.

A third phase of the experiment was tried, originating this time with two students who, with their advisory committees and the Committee on Graduate Work in Education, worked out the details of a plan whereby semi-integrated examinations would be applicable only to the preliminary examinations (that is, the minor areas). It called for the selection by the student of a large, practical problem in the field of his major interest and the approval of this problem by the student's advisory committee and by the Committee on Graduate Work in Education. The statement of this problem was then sent to specialists in each of the areas covered by the examination. Each was asked to prepare questions which would call for information and kinds of thinking needed in dealing with the problem proposed by the

student. The student was then asked to answer the questions without attempting to write a unified discussion; but instead of taking the test in each area in a separate period, without reference to what was in the other tests, he was permitted to take all of this at once, and prepare the papers during a three-day period. In this way he could deal with closely related questions from different lists at the same time. Unlike those who took the separate preliminary examination in the ordinary way, and like those who took the older form of integrated examination, he had access to any reference material he might choose, but the time was short enough that he would not be able to do any extensive searching of printed materials. When the students passed these examinations, they were permitted to take the general examination—in their major fields—in the regular way.

Results showed that this was a type of examination which was not too difficult. There is a sharp difference of opinion within the Department as to its validity, however. Some hold that any written examination in which the student has access to written or printed sources of information or has any opportunity to secure help from other persons is ineffective in measuring his competence. Others take the position that this is a more valid type of test because it more closely resembles the way in which one who is working on a job tackles problems and finds and uses information relevant to his problems.

Another interesting line of experimentation in departmental policy has had to do with attempts to secure a more broadly based specialization for the Master's degree. The Department is large and contains professors with a wide variety of fields of professional interest and of competence. Several years ago, the Department came to the conclusion that a good many students were specializing too narrowly. It believed that there are certain broad, general concepts, knowledges, and skills that all students who are to receive a Master's degree in education ought to have. The Department proceeded, therefore, to set up means by which it was hoped that this kind of competency would be ensured. It established three five-hour courses entitled "Foundations of Education," "Historical Development of Educational Problems," and "The Organization of Educational Agencies." These courses constituted a so-called graduate sequence. The three courses were expected to be closely integrated and to constitute the basic sequence in fact as well as in

name. Students were not required to take the courses, but they were required to pass the comprehensive examination based upon them. Most students naturally took the courses.

This plan did not work as well as expected, and after about three years' trial, the sequence requirement and the courses were abandoned in favor of one elective course, "Foundations of Education." The general-examination requirement was continued. Its purpose has been to test the student's competence in such abilities as the following: first, writing clear and effective English; second, dealing with practical educational problems in terms of a basic philosophy of education, and in terms of conditions peculiar to a specific school and community situation; third, using the library effectively in the study of educational problems; and fourth, being familiar with the more important current developments and trends in education. In the opinion of the Department, it has served the purpose of preventing narrow specialization, ensuring certain broad understandings and certain necessary skills.

There was one frequently mentioned criticism of this plan, however. Students and their advisers thought that they had insufficient guidance concerning the kinds of competencies they would be called upon to demonstrate by this comprehensive examination. The Department therefore approved the idea of giving to each student beginning work for the Master's degree in education a diagnostic test covering the same general field. It was understood that no one would "pass" or "fail" this examination, but that its purpose would be to diagnose the student with respect to the required basic competencies and to inform him and his adviser concerning his status with respect to them. In this way the results of the examination would provide a more effective basis for planning the work with the student. This has been tried for the last two quarters with results that justify further experimentation.

In the course of its experimentation, the Department has thus passed from a procedure which involved, practically, the requirement of a sequence of three five-hour courses with a comprehensive examination based upon these, to a required diagnostic test, a general comprehensive examination, and an elective course, "Foundations of Education."

Further evidence of the interest of the College in experimentation is the existence of a Bureau of Educational Research

as one of the departments of the College. Significantly, the Bureau promotes experimentation through its training program for research assistants. Several young persons with Masters' degrees who are working toward the Ph.D. degree are part of the staff of the Bureau in the capacity of research assistants. Each assistant is "assigned" to a senior member of the Bureau staff to work with him in his research activities. Each senior staff member and his assistant jointly plan a series of activities and experiences for the assistant which will qualify him to carry on specialized research projects of his own. This is an important contribution to the cause of experimentalism.

Experimental Programs in Personal Planning

One of the principal efforts which the College puts into experimental programs in personal planning has already been described in one of the preceding articles in this series.[2] The story of the development of the introductory "survey" course and of the "advisory plan" is one of great interest to those who desire to promote fine personal relationships between staff and students and to facilitate the growth of personal competencies through group discussion of interesting problems. The University has experimented with, and found wanting, the doctrine that the campus is a place to train the mind alone. In its place has come the belief, and the practices which give the belief substance, that the University has a responsibility for education of the person—and his intellectual interests, moral concerns, aesthetic interests, civic judgments, health, and social life, being irrevocably interdependent, are taken into account.

Thus it is that considerable attention is paid to the personal development of students who are variously handicapped in an organic sense. The program for this group in the physical-education department is largely experimental—trying to find suitable developmental activities for each student, based, of course, upon his organic, social, and psychological status as determined by examinations and interviews. There is no mold of correctional activity into which all such students fall. On the contrary, it is held that each student is different, that no matter what his handicap, his physical education should be looked after, and that social, recreational, psychological, and physical development may all come through participation in the activities

[2] Love, L. L., and others. "Beginnings of the Professional Program," Educational Research Bulletin, XIX (February 28, 1940), pp. 119–38.

appropriately chosen with and for him. The College, through its program in physical education, experiments annually with a hundred or more such students, both men and women, with the hope of aiding them to better adjustment, not only to education as a profession, but to life itself.

For the more normal student a similar type of experimentation takes place. The program of the Department of Physical Education provides a staff of over thirty instructor-counselors, who, in the elective programs of physical education, assist students to plan their recreational life, to learn new skills, to progress in health so that greater facility in social and motor skills and a greater fitness for all that life brings will emerge.

The development of the various phases of the program in personal planning has not been a simple matter. For example, in the development of the freshman program[3] the committee in charge, operating in terms of certain hypotheses concerning the content of the program and how it should be administered, presented proposals for the beginning program. The Freshman Program Executive Committee, representing the various areas of the College, determined which experiences were most promising in the light of the purposes accepted for the College. As the freshman work progressed it was evaluated by many different procedures. This in turn resulted in new hypotheses, new procedures to test these, and reconstruction where evidence required it. Thus was set into motion a program of experimentation for which no immediate end is anticipated.

One feature of the freshman program, as it has taken form, has been the development of a system of advisers, an idea which at first had only partial support. Last year, however, nearly fifty persons had advisory relationships to the program. In these relationships they are entirely free to experiment with new procedures. The advisers and their assistants meet weekly during the period of the survey course to exchange suggestions, develop criteria for student evaluations, and appraise the effectiveness of the course as it develops. These meetings serve as important in-service training.

In the survey course, to which advisers have a relationship through their advisers, a major emphasis is placed upon planning procedures.[4] As faculty advisers aid students in arriving

[3] *Op. cit.*
[4] *Op. cit.*

at their own schemes of values, clarifying purposes and proposing courses of action, both students and advisers engage in the initial steps of experimentation. It is not, of course, enough that this kind of action occurs. If significant progress is finally to be made in the development of the experimental attitude on the part of the recruits to the profession who go out from this College, the staff must help students intellectualize the process in which they are engaged as they plan.

One opportunity to foster this end is provided by the student council. During the regular meeting of this council the students and faculty advisers define problems, suggest solutions, and plan courses of action for testing them. The determination of criteria for marking in the freshman course is illustrative of the co-operative attack upon problems by students and faculty through the council. In the initial discussion of the problem this question arose: Should the individual advisers, who were related to the course in this capacity but had no responsibility for the course as such, participate in assigning student marks? Considerable skepticism was evident among the students. They indicated that they were afraid that present personal and extremely helpful relations with their advisers might be hindered. Accordingly, the hypothesis that marks would better estimate student progress if the advisers did not co-operate in determining them was set forth. Analysis of student reactions to their mid-term marks was suggested as one test of this hypothesis, and these reactions were reported in the succeeding council meeting. Dissatisfaction was obviously apparent. Students felt that the results on the objective examination alone were an inadequate measure of their progress. They pointed out that this was particularly true in regard to the many intangible desirable characteristics of personal development toward which the experiences of the program were contributing. It was maintained that the adviser was in the best position to observe the student in these various experiences and that his opinion of the student's behavior was essential. Hence a second hypothesis was projected: an adequate description of student progress could be achieved only through a plan providing for the inclusion of the adviser's estimate.

Special Opportunities for Experimentation

WHETHER education is a science in the strict sense and whether its experimentation is always controlled as precisely as it would have to be in chemistry is of no great moment. The significant fact is that an education which is to prepare teachers in a society that expresses faith in intelligence must, and can, take the experimental outlook seriously. If the College is not itself experimental, its products will be devoted to this outlook only by the merest chance. Exemplification of the outlook, on the other hand, will mean that students actually participate in experimentation as they develop their professional standards.

A rich variety of opportunities to learn something about experimentation is available, fortunately, to most students in the College. Not all of such opportunities can or need be mentioned here. Illustration will suffice. In the required course in educational psychology students serve as subjects in experiments from time to time as well as conduct minor researches on their own. This course is being experimentally developed; hence new ideas are constantly tried out and evaluated. Most students take this course in the freshman year, a fact that early brings them in relationship to an experimental point of view. These students also take their first education course in this year and, since this course equally emphasizes the experimental outlook, more of an opportunity to build cross-relationships is probably at hand than as yet has been realized. The experiments dealt with in educational psychology concern the students themselves. They are not interest-arousing little stunts. Usually the class as a whole participates in research directed toward the improvement of the course. Hence, they are personally involved in an educational situation in which an experimental attitude is actually functioning.

The point of view emphasized in the reading throughout the course is likewise experimental. The supplementary readings are in large part gathered together in a casebook which is dedicated "To the Teachers Who Experiment." Of perhaps relatively minor importance, but still to be mentioned, is the mimeographed sheet on co-operative projects used in the course. Briefly the plan operates so that students may volunteer to do

various bits of work for the course, such as making charts which summarize experimental work. In a narrow sense this work is not experimental, but it usually has to do with experimental work and methods of presenting the results of such work.

Each year two or three freshman men who need financial help and who are qualified, are chosen to serve as undergraduate assistants in educational psychology. These students first help in routine matters, such as scoring objective tests, mounting materials for exhibit, getting out and putting away charts used in classroom discussions. Gradually these students, as they show interest and ability, participate in other undertakings connected with the course and assist in the course experiments. From the very first they attend staff meetings. The fact that most of these students later enter graduate work in psychology seems to be good evidence that this plan develops an interest in the experimental solution of educational problems.

The required course in elementary psychology is explicitly organized in terms of the development of scientific attitudes toward problems of human behavior. The knowledge students possess about human behavior when they register in psychology includes a host of ideas developed by our particular cultural life. Many of these have been shown to be false on the basis of carefully collected information. Most students believe, for instance, that playing certain games, like chess, will develop powers of concentration or that the study of mathematics is valuable because it tends to develop a logical mind. The first statement is subscribed to by about 83 per cent of the students who register in the course and the second by about 70 per cent. In each case the belief relates to uncontrolled observations on what human beings and animals are doing. Some two hundred such propositions have been studied in considerable detail.[5]

Unfortunately, a great many misconceptions were still believed by the students after having had the course in psychology, so that as a result of this study, made some five or six years ago, the emphasis was changed in the course to include a more extended treatment of some of these propositions. The automatic transfer of the scientific method as an instrument for negating a misconception is no longer depended upon; actual practice in dealing with these questions is given.

[5] Valentine, W. L. "Common Misconceptions of College Students," *Journal of Applied Psychology*. XX (December, 1936), pp. 633–58.

It is hoped that students, as they complete their work in elementary psychology, will be able to plan experimental procedures with new materials which take these factors into consideration. It has been found necessary to establish a variety of situations in which the students are given the opportunity to follow out these principles. One visiting these elementary classrooms would find a laboratory atmosphere consisting of charts, diagrams, and instruments of control and precision which serve as useful tools in the application of the scientific method to the problems of human behavior.

The practium for training counselors in remedial-study work is a further illustration of the impact of the experimental attitude upon an important phase of the College program. While the students learn about counseling techniques from reading and discussions, their primary learning comes from working with actual students on their problems. The counselors are assisted in making the diagnosis, but they must "experiment" as to the best approach to bring about improvement on the part of the student. The success of a particular technique in improving a study skill is rather easily measured and so assists the counselor in an evaluation of his progress. Since each counselor has several students to work with, he soon realizes that one set of techniques will not work for all, that in his relationship with each student his approach must be appropriate to that student's needs.

The field of health and physical education offers interesting experimental opportunities both within the normal programs of undergraduate and graduate study and in the field service which the Department conducts. There is brought to the attention of the Department rather constantly, for example, the need for experimentation with recreational therapy in state institutions. At present a candidate for the Doctor's degree, attached to the staff of the State Hospital for the Insane, is administering a large program of recreation there to determine the effects upon insane patients of exposure to a wide range of recreational pursuits. Early results from this program are significant only in terms of an enrichment of institutional life. There is little evidence yet of actual rehabilitation of psychic order or adjustment.

Comparable programs or smaller projects have been attempted at the state schools for the blind and deaf, and at the Ohio Penitentiary a limited recreational program was developed

which gives opportunity for ten graduate students to study recreation and the penal problem. Church groups, clubs, and settlements frequently call for assistance in the solution of some problems and wherever possible these problems are utilized experimentally rather than merely performed as a service. These opportunities become significant in the training program of the Department because they enable the staff to take students directly to field situations for study.

The most carefully controlled of such opportunities, however, are to be found in the physical-education buildings themselves. Here, both in conjunction with research courses and through the individual research efforts of members of the staff, experimental projects on metabolism, foot therapy, swimming in its relation to functional orthopedic handicaps, and strength testing as a potential indication of health status have been undertaken. Students participate fully in these projects and thus appreciate the many complexities in evaluating the place of health and physical education in a program of child development. One of the principal problems which has been carried has been an investigation of the validity and use of the physical fitness index. Work with this index supplements more routine experimentation with anthropometric, cardio-vascular, motor ability, behavior traits, and knowledge tests—the objective being in most instances not only to reveal more appropriate means of evaluating health and physical-education programs, but to give students experience with the tools of experimentation.

In such a program it is not surprising to find in the College a widespread interest in growth of interpretative abilities on the part of students. These abilities are of especial concern to instructors in history of education since any historical treatment is an interpretation of facts read off against the background of meanings of a particular historian. It is essential, therefore, that students of the history of education be experienced in the techniques involved in the search for facts and in their reporting and their interpretation.

One of these experiments was more rigidly controlled than the others. Two types of experiences were provided for two groups of students who were regularly enrolled in the basic course in the history of education. A conventional group listened to lectures, read textbooks, and otherwise received the

customary interpretations of certain historical facts. An experimental group practiced certain techniques of fact-finding, and received special training in their interpretations. Both groups were given a pretest on the ability to interpret data and a final test at the conclusion of the experiment. The results of these tests revealed the superiority of the fact-finding and fact-interpreting techniques over lecturing and reading in helping prospective teachers improve their ability to interpret historical material as this relates to education.[6]

The foregoing are but a few of the several special opportunities offering training in experimental methods. It is safe to say that some opportunity is given in every area of the College: in vocal music where the entire teaching and studying of voice is experimental; in industrial arts where materials, design, and method offer excellent opportunities for experimentation; in elementary education with its concern for the learning process in its relation to child development. The formal courses which are offered in experimental methods include such diverse titles as: Educational Experimentation, Techniques of Curriculum Construction, The Thinking Process in Its Educational Bearings, Achievement Tests in Higher Education, Experimental Psychology, Elementary and Advanced Educational Statistics, Mental and Educational Tests, Psycho-educational Diagnosis and Treatment, Educational Tests and Measurements, Special Statistical Methods, Advanced Experimental Laboratory, and several others pertaining to aspects of clinical methods and measurement in adjustment and development problems.

Summary

No summary of the development of experimental attitudes in the College would be complete without a frank statement of the fact that there are many uncultivated opportunities for such development. The fact that the College is, in the main, acutely conscious of the desirability of bringing into being such points of view in the thinking of its students and faculty is important. That consciousness does not mean, however, that

[6] An analytical report of the results of this experiment will appear in a forthcoming issue of the EDUCATIONAL RESEARCH BULLETIN.

as much work is being done as can be done. As the years pass the integrity of the staff must be relied upon to develop even further the programs which have been started. Three examples of rich opportunity for further development may be cited.

First, it is conceivable that a reorganization of secondary education far more drastic than anything yet attempted could be tried out in the University School. The basis for the reorganization might well be the life of the school in a given community. Under the direction of competent sociologists, this community could be studied by students to familiarize themselves with its major problems, as well as with the major institutions through which the community carries on its work. In such a study the sociologist, psychologist, philosopher, teachers, and students could work hand in hand in attempting to gain a realizing sense of the major problems which confront the participants in a living community. Moreover, our college students could be introduced into the life of the University School almost from the beginning of their campus activity. They could work with groups of pupils, with teachers on special projects, and in other ways assist wherever they were needed. Through these participative acts they might be expected to gain an experience with the problems of the School which would serve as a useful basis for the later construction of an educational theory. Such a program would necessitate the breaking down of subject-matter lines within the professional areas. Sociology, psychology, history of education, educational philosophy, and methods of teaching could be unified in terms of the common problems which the school faces in the community. The need for more separate treatment of these subjects would perhaps arise only at those points in the teacher-education program where a demand arose for bringing together into some systematic form the basic concepts in the special fields. It is conceivable that such a reorganization would have important repercussions on the so-called academic training of the student, leading perhaps toward broad orientation courses and away from present specialized offerings.

Second, a teacher-education program leading to the student's more effective functioning in the core-curriculum organization now emerging in secondary schools could be attempted in the College. Conventional subjects do not now provide a satisfactory basis of preparation for participation in reorganiza-

tion of this character. Some schools have found it desirable to break down subject-matter lines and to draw upon all of the available resources of the school in meeting this problem. An illustration of such a problem is to be found in a "housing" unit worked out in the University School last year. This unit drew upon such fields as social studies, language, the arts, science, mathematics, and health and physical education.

This year the University School is experimenting with three types of organization, all designed to contribute to the basic reorganization of secondary education: first, the co-ordinated teacher technique, in which one teacher has charge of the class but draws upon specialists in the various fields in terms of the problems taken for study; second, the unified studies technique, in which teachers representing three fields—social science, English, and science—work intensively with a given group of children, plan units together, and draw upon other areas of the school for assistance when needed; and third, the over-arching purpose technique, in which teachers of the various fields decide upon the basic objectives which they are striving to achieve and, through frequent conferences and discussion, seek to arrive at common understandings which they may emphasize in their differing subject-matter areas.

One of the chief stumbling blocks to the reorganization of secondary education in these terms is the fact that teachers have not been trained to pursue these purposes. By and large, teachers are trained to teach in conventional subject-matter fields. When they are placed in programs of this character, they tend to lose their sense of security. The College is only beginning to prepare teachers for this type of service. Special methods courses in the separate subjects are still employed as the basis for preparation. With the University School supplying adequate facilities for the study of core curriculums in action, it ought to be possible for the College to develop a course, taught co-operatively by specialists in the various fields, which would acquaint students with varying methods of reorganization. The University School would serve as an excellent laboratory for this purpose and hence a further point for co-operative effort in the total program would emerge.

Third, a complete acceptance of the doctrine that the teacher in particular and the school in general have a major responsibility for the growth and development of the "whole child" would

call for considerable experimentation in regard to the teacher's preparation in the life sciences. What should the teacher know about the health of the school child? How much more effective will education be if his organic problems are treated as thoroughly as his social problems? How much waste is there in education because of teachers' ignorance concerning simple health matters? What functional material should the "basic sciences" be contributing toward the preparation of teachers? These and a dozen more questions need cultivation.

This story, over-long as it appears, only partially treats of the activity going forward in the present College program which has bearing upon the fostering of an experimental outlook on the part of our students. What has been presented ought to have made it clear that whether any given staff member or any particular course makes its fullest contribution to the experimental point of view is not as important as the presence of a disposition in the College to make the experimental outlook central. To question, to demand evidence, to employ logic, to evaluate and interpret experience, to make use of determined facts, to vary conduct in view of new occasions—these are evidences of the growth of experimental procedures. To be concerned that our culture give each individual an opportunity to participate in it in terms of such procedures, staking the case for human betterment on the consequences of activity so controlled—this is the evidence of the growth of the experimental outlook. It is in these directions that the further work of the College needs now to be more sharply pointed. Our students may then come to professional stature in a culture within which it is the normal expectation that individuals shall expect concern over the creation and protection of conditions that foster reflection. They may then be expected, as they teach, to make the significant contributions to an understanding of human association which are now so sadly needed in our democracy.